NIMA JMTK 4.2

Spatial Data Base, Analysis, & Utilities

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NIMA JMTK Objective

- **To provide a tool kit of common functionality that supports the mission application developer in delivering Mapping, Charting, & Geodesy (MC&G) capabilities to the war fighter using:**
  - Standard NIMA data products and user defined data types
  - Existing software capabilities
  - DII COE engineering standards

NIMA JMTK Segments

- **Spatial Data Base (JMS)**
  - Import, manage, query, retrieve, and export geospatial information for use by mission applications as well as other JMTK software components
- **Analysis (JMA)**
  - Mobility, Obscuration, and Surface Analysis functionality to provide predictive data concerning the battle space
- **Utilities (JMU)**
  - Common cartographic capabilities utilized in all MC&G applications along with functionality to support software independence on the DII COE recognized platforms

JMTK Spatial Data Base

- **Imports, manages, retrieves, and queries:**
  - Standard NIMA data products in:
    - » Vector
      - Includes both Vector Product Format (VPF) and Standard Linear Format (SLF)
    - » Raster
      - Raster maps and imagery in the Raster Product Format (RPF) and ARC Digital Raster Graphic (ADRG) format
    - » Matrix (gridded)
    - » Attributed Geographic Points
  - User Defined Data Types

Supported NIMA Vector Products

- **Vector Smart Map (VMAP) levels 0, 1, & 2**
- **Digital Nautical Chart (DNC)**
- **Vector Interim Terrain Data (VITD)**
- **Urban Vector Map (UVMAP)**
- **Foundation Feature Data (FFD)**
- **World Vector Shoreline Plus (WVS+)**
- **Digital Topographic Data (DTOP)**
- **Interim Terrain Data (ITD) in Standard Linear Format (SLF)**
- **Planning Interim Terrain Data (PITD) in SLF**

Other Supported NIMA Products

- **Raster**
  - Compressed ARC Digitized Raster Graphic (CADRG), all scales
  - Controlled Image Base (CIB) 1, 5, & 10 meter
  - ARC Digitized raster graphic (ADRG), all scales
- **Matrix (Gridded)**
  - Digital Terrain Elevation Data (DTED) levels 0, 1, & 2
  - Digital Bathymetric Data Base - Variable Resolution (DBDB-V)
- **Attributed Geographic Points**
  - Digital Aeronautical Flight Information File (DAFIF)
  - Gazetteer

JMS User Defined Data Types

- **The NIMA JMTK Spatial Data Base supports the import, management, and retrieval of user defined data types**
- **New data types are registered with the JMTK Spatial Data Base by name, unique identifier within the file, and byte offset**
- **User defined data types can have as many attributes as necessary**
- **Retrievals can be by name and/or by attribute values**

JMS RDBMS Support

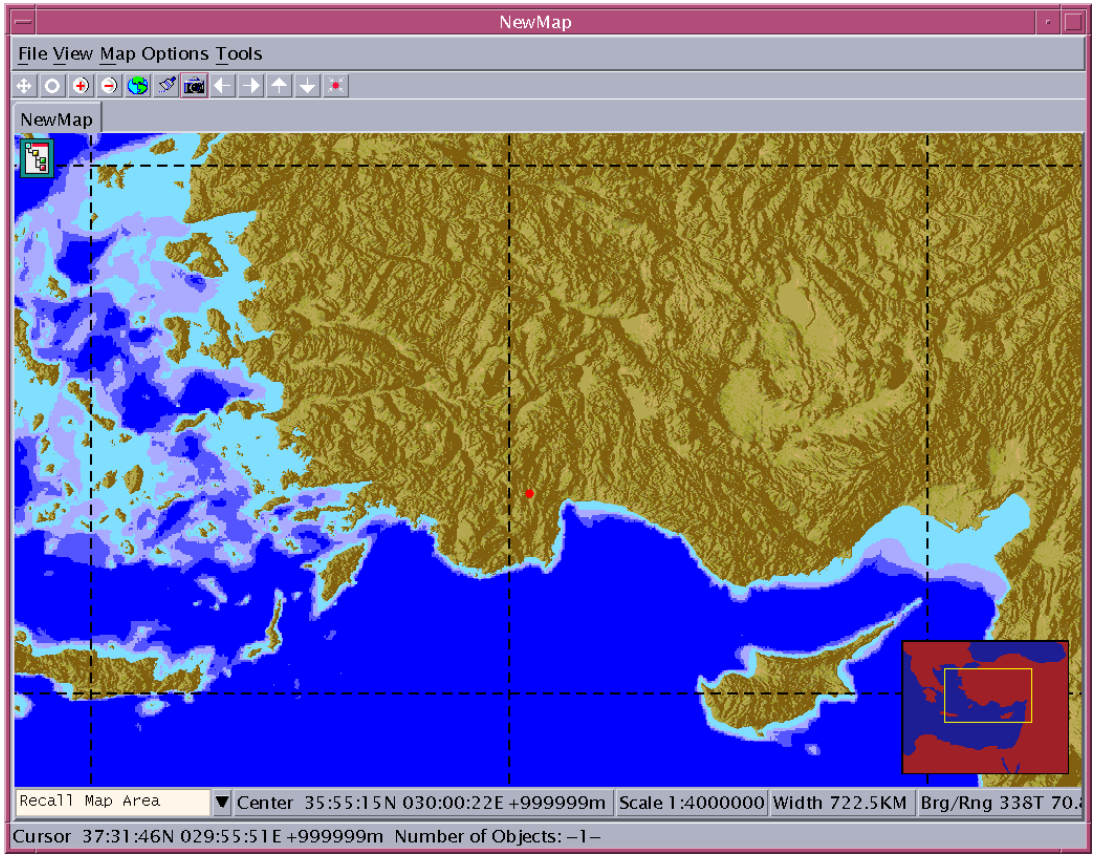
- **NIMA JMTK incorporates a Relational Data Base Management System (RDBMS) to support data management and query**
  - Solaris and HP platforms are delivered with Postgres
  - NT platform is supported by Fourth Dimension (4D)
  - Solaris platform can also use Informix if available

Additional JMS Capabilities

- **Query of data dictionaries, data base tables, and feature attributes using Standard Query Language (SQL)**
- **Common data management functionality such as copy, move, delete, and renaming of managed geospatial information**
- **Export of subsetted VPF, RPF, and DTED formatted data in NIMA standard product format**
- **Retrieval of Raster and Matrix formatted products in both native and tailored formats**
- **Capability to render DBDB-V data through a Draw Module**

JMS DBDB-V Draw Module

- **Renders the best DBDB-V resolution available for the specified geographic area**
- **Provides three rendering methods:**
  - Hypso Shading
  - Contours
  - Shaded Relief
- **Utilizes the Cartographer Color Map**
- **Supported on Unix platforms in 4.2**



JMS DBDB-V Draw Module

- **Packaged with JMS Run-Time Segment in the bin directory and includes:**
  - Draw Module Installer: InstallJMS
  - Draw Module: DrawJmsData
  - Draw Module Run Script: DrawJmsDataRun
- **DBDB-V must be loaded through the JMS**
- **User invokes the installer**
  - Registers the draw module with Cartographer
  - Only needs to be executed once

JMS DBDB-V Draw Module

- **The JMV Cartographer server needs to be invoked prior to invoking the DBDB-V Draw Module**
- **User executes the "DrawJmsDataRun" script from the JMS bin directory**
  - Sets the appropriate JMS/JMU environment variables
  - Sources the necessary JMV environment scripts
  - Invokes the Draw Module
- **If using the JMV "Chart" application, users need to activate "Jms Data" from the Map Features dialogue**

JMTK Analysis Component

- **Tool kit functions to perform analysis of geospatial data managed by JMS with additional data supplied by the mission application to evaluate:**
  - Mobility
  - Obscuration
  - Surface characteristics

JMTK Mobility Analysis

- **Cross Country Movement (CCM)**
  - Calculates the ability of a specified vehicle(s) to traverse a transportation network or cross country terrain within a given AOI
- **Time of Travel**
  - Calculates the time(s) of travel for a specified vehicle(s) to traverse a specified path within a transportation network or cross country terrain or both

JMTK Obscuration Analysis

- **Optical Terrain Masking**
  - Analyzes terrain data to determine where the observer can or cannot see
- **Radar Terrain Masking**
  - Analyzes terrain data to determine where radar sensor can and cannot see
- **Optical Intervisibility**
  - Determines optical intervisibility between two points or over an area
- **Radio Intervisibility**
  - Analyzes the radio link between two given points to determine the signal loss

JMTK Surface Analysis

- **3D Ground Distance Calculation**
  - Calculates the total distance traveled along a specified path using the changes in terrain elevation
- **Area Gradient Analysis**
  - Calculates the gradient magnitude and direction based on a particular AOI
- **Bathymetry Analysis**
  - Analyzes bathymetric (ocean floor) data to produce color coded contours for display
- **Hypsography Analysis**
  - Illustrates elevation data over a specified AOI by distinctly coloring elevations at determined levels
- **Magnetic Variation**

JMTK Surface Analysis

- **Ridge Channel Analysis**
  - Generates vector data for ridge and/or channel lines given an AOI and filtering threshold
- **Sensor Prediction**
  - Performs a Sensor prediction analysis and stipulates the output of a specified sensor over a specified area
- **Slope Calculations**
  - Calculates the slope and slope direction between two geodetic points
- **Terrain Profile Analysis**
  - Analyzes terrain data to determine the elevations along a path in order to create a vertical cross-section

JMTK Utility Segment

- Provides common Mapping, Charting, Geodesy, and Imagery (MCG&I) functions that do not require specific geospatial information from the SDBM.
  - **Datum Transformations & Coordinate Conversions**
  - **Unit of Measure Conversions**
  - **Distance Calculations**
- Supports all JMTK domains with common functionality that are platform independent.
  - **File system and file I/O support**
  - **Memory operations**
  - **Threading**

Support Software

- **NATO Reference Mobility Model II (NRMMII)**
  - Provided and maintained by Waterways Experiment Station (WES) and used to support the mobility analysis functions
- **Terrain Integrated Rough Earth Model (TIREM)**
  - Provided through the Army's TEM software and used in radio analysis
- **GEOTRANS**
  - Provided and maintained by NIMA as the standard Datum Transformation & Coordinate Conversion software
- **VPF Exploitation Software**
  - Provided and maintained by the US Army Topographic Engineering Center and used to export VPF products

Disk Space Requirements

	Solaris	HP	NT
Run Time (in Mb)			
– JMU	10.3	10.4	10.3
– JMS	4.4	3.7	14.8
– JMA	19.4	19.4	18.7
Software Development Kits (in Mb)			
– JMU	2.5	4.2	3.1
– JMS	1.5	2.1	3.3
– JMA	22.0	3.1	4.3

STERLING SOFTWARE

NIMA JMTK Support

- **Help Desk**
  - Supports NIMA developed JMTK components: JMS, JMA, JMU
  - E-mail: jmtkhelp@jmtk.org
  - Phone: 1-888-549-JMTK (5685)
  - Availability: 8:00 AM to 5:00 PM EST, Monday thru Friday
- **Web Site**
  - www.jmtk.org
- **Project Manager**
  - Cheryl Blake
    - » E-Mail: blakec@nima.mil
    - » Phone: 703-755-5384
    - » Address: NIMA/ATAET, MS P-76, 12310 Sunrise Valley Drive, Reston, VA, 20191-3449

Application Development

- **All public APIs are documented in the API Reference Manuals provided with the segment documentation**
- **Man pages for each API are provided with the Software Development Kits**
  - /h/COE/Comp/jmsSDK/man
  - /h/COE/Comp/jmaSDK/man
  - /h/COE/Comp/jmuSDK/man
- **Reference Implementation of all APIs can be found in the test software source code provided in the Software Development Kits**
  - /h/COE/Comp/jmsSDK/Integ/TestSuite
  - /h/COE/Comp/jmaSDK/Integ/TestSuite
  - /h/COE/Comp/jmuSDK/Integ/TestSuite